



# **Sand Dune and Shingle Network**

Eighteenth Newsletter, March 2014

*Linking science and management*



## Introduction



### Paul Rooney

**Director – Sand Dune and Shingle Network**

Welcome to the eighteenth newsletter of the UK Sand Dune and Shingle Network. This is a 'bumper' edition as it is just over seven months since our last newsletter. This newsletter contains many reports of coastal change as a result of the

December 2013 storm surge and subsequent events. It will be interesting to see how we react to these changes, both in policy and practice, as it may well prove a test of commitment to work with natural processes on the coast.

This newsletter also reports on the highly successful dune eco-hydrology event organised by Charlie Stratford from CEH, and the latest progress with the exciting Welsh dunes rejuvenation project. We wish to organise two workshop events for Network members over what is left of this year and early 2015, so please get in touch with suggestions and offers of assistance.

In previous publications we have included a European Dune Network section in the UK Network newsletter. This section has grown so popular, and contains so much news, that for the first time we have published it as a stand-alone publication to accompany the UK newsletter. I trust that you will enjoy both publications, and that you will continue to support our international perspective.

Every six years, Member States of the European Union are required to report on implementation of the Habitats Directive. This is called 'Article 17' reporting. The last time this was completed was in 2007 and it reported that 'dunes, bogs and grasslands are the habitat groups with the worst conservation status' (EIONET 2007). We are awaiting the full results of the latest 2007-2012 reporting round, but sadly I expect things will have changed for the worse, for dunes especially.

These unfortunate trends highlight the importance of us working together nationally through the UK based Network, and internationally through the European Dune Network, the family of EU LIFE projects and the eagerly anticipated outcomes of the repositioning Coastal and Marine Union – EUCC. Please support the EUCC events this year in Merlimont, France (June 2014) and Littoral 2014 in Klaipeda, Lithuania (September 2014). They are likely to be milestone events that re-affirm the international conservation agenda for coastal dunes and shingle.

Finally, welcome to our new graduate intern, Tom Marshall. Sincere thanks are due to Tom for his hard work helping us to catch up with a backlog of work, and keeping us abreast of all that is going on at the moment on the coast.

## Network News



### Tom Marshall

**Network Assistant**

Hello and welcome to the 18th Sand Dune and Shingle Network newsletter. Firstly we would like to apologise for the lateness of this issue and thank you for your patience. The issue is brimming

with articles and pieces because of the delay, so I hope you enjoy my first contribution.

I have been here at the newsletter since January; joining as a graduate intern, trying my best to connect with all you members and readers. I feel privileged to be a member of this. I am delighted with the internship and the opportunity this is providing me to increase my knowledge and experience.

Recently significant attention has been given to coastal settings here in the UK. High tides and record rainfalls combined with storm conditions have brought coastal and flood defences to the foreground of public consciousness. This gives us a lot to talk about. We have covered some of the storm activity within this issue, but we want to know is how your local dunes and shingle sites have fared. The coast is always changing. We want to connect with site managers and policy makers and find out how things have been, what's been happening, how they think the future looks. The storms have generated a brand new coast, a brand new case study.

I would like to draw your attention to our new website also as it has really been changed to a new web content management system and the content is updated. This has taken up most of our time in recent months.

I would like personally to thank all the contributors to this newsletter. I would also like to thank John Houston and Paul Rooney and the staff at Liverpool Hope University for guiding me through my first newsletter.

If you have any ideas and suggestions for the next newsletter, please contact us here at the Sand Dune and Shingle network at [dunes@hope.ac.uk](mailto:dunes@hope.ac.uk). We are already planning our next issue.

Please visit our new website at <http://coast.hope.ac.uk/> and provide feedback at [dunes@hope.ac.uk](mailto:dunes@hope.ac.uk)

# Wild winter

John Houston and Tom Marshall

The winter of 2013-2014 has seen perhaps the longest period of sustained storms for many years. Starting with the tidal surges of early December the unsettled weather continued throughout January and into February with wave after wave of deep Atlantic depressions and storms. Coastlines across the UK have taken a battering with many reports of cliff and dune erosion, tidal inundation and shifting shingle features. At Formby Point on the Sefton Coast, North-west England, for example, the National Trust saw two years worth of erosion in a single day based on recently recorded rates of erosion.



Formby Point, Sefton Coast © John Houston

And this is the interest. Coastal managers from bodies such as The National Trust have moved from trying to protect habitats from loss to a 'shifting shores' view (See <http://www.nationaltrust.org.uk/article-1355823320656/>). It

would be expected that much of the sediment mobilised in the storms remains in the coastal 'cell' and will be redistributed within the system building up beaches and dunes. Or are there places where the storms have reshaped the coastline? Over the next year or so we will be following stories about the recovery to coastal habitats. Perhaps the most important action to take along dune and shingle coasts now is to establish some form of monitoring.

Eastern coasts were particularly affected by tidal surge, as great as that of 1953. Some of the early reports were of 'damage' to east coast reserves such as Spurn Point, Blakeney Point, Gibraltar Point, Snettisham, and so on (see, for example, <http://www.rspb.org.uk/supporting/campaigns/flood-appeal/index.aspx>). But is this really 'damage' or is it just coastal change, a change that is both inevitable and desirable in the long term.

A few reports of coastal change are included in our newsletter and we are pleased to see that monitoring studies have been funded at some sites. See, for example, <http://www.nerc.ac.uk/press/releases/2014/01-stormsurge.asp?cookieConsent=A>. The storms will have re-opened discussions in many areas about management where sea level rise and extreme variations in weather patterns are now forecast. We believe that the Network will have a role to play in supporting and informing the dialogue leading to decisions on the future of our coast.

## The tidal surge and its impacts at Blakeney and the North Norfolk Coast

Ajay Tegala, Coastal Ranger, National Trust

On the 5-6th of December 2013, there was the biggest North Sea storm surge for 60 years (UK Environment Agency). Along the North Norfolk coast, loss of life was avoided, but many properties were flooded. The surge had significant impacts on many places, including re-shaping of sand dunes and shingle ridges, and in two locations serious damage to seawalls and flooding of areas designated as "hold the line" in this epoch in the North Norfolk Shoreline Management Plan.

The north Norfolk coast is a mosaic of towns, villages, farmland, natural and semi-natural habitats, used extensively for recreation and much of it is protected by legislation such as the EU Habitats and Birds Directives. The current Shoreline Management Plan (SMP) includes a mix of no active intervention, hold the line and future managed retreat policies.

This surge offers a unique opportunity to investigate the environmental impacts and social and policy responses to a severe episodic event. With rising sea levels, the frequency of damaging storm surges will increase, so better understanding of the environmental impacts of these events is vital for the development of suitable response strategies.

To be able to determine the environmental impacts of this storm surge event, it is vital that measurements are collected as soon as possible afterwards, to form a baseline from which ongoing impact and recovery can be assessed. The same is true for the social science work; as memory



Blakeney Point, © John Houston

of events, decisions and processes can be distorted with time, especially if resulting from an immediate and perhaps somewhat disjointed response to an unexpected and sudden event. The University of East Anglia (UEA) have been successful with a NERC funding application and will be supporting the National Trust and others to investigate several aspects. The UEA work plan is:

1. High resolution aerial survey of changes to coastal habitats.
2. Soil survey to determine impacts to soil microbial community, ecosystem functioning, carbon and nitrogen cycles and extent of soil salinization.
3. Changes in vegetation and soil macro-fauna.
4. Social and policy responses to flood damage and landscape change.

(continued overleaf)



Specifically at Blakeney Point, the tidal surge and storm changed the geomorphology of Blakeney Point overnight.

The main shingle ridge was flattened and material was pushed inland c. 10m. This buried much of the vegetation, for example Curled Dock *Rumex crispus*, and the number of birds observed feeding on the seeds through the winter has been reduced. The tip of the Point was also covered in shingle. It used to be sandy and we will monitor how Sandwich Terns and gulls respond when they return to this important colony site. The sand dunes on the Point were eroded on the north edge, up to 5m in places, and a sandy cliff-face 2m high was created for nearly a mile. Huge

quantities of tideline 'thatch' and rubbish was washed up into the dunes and is now covered by wind-blown sand.

To the east, the shingle ridge was breached in two places, became fully tidal for a while flooding the grazing marshes, but by March has largely self-healed. Also, over 500m of seawall around the freshwater marsh at Blakeney was flattened, 158 ha of marshes were inundated and the future of this area is currently uncertain.

The Geography Department at Cambridge University is also involved in ongoing research on coastal flooding with North Norfolk as one of the case studies.

## Effects of winter storm surges on the Sefton Coast, north Merseyside

Philip H. Smith

Although not affected as badly as some regions, the Sefton Coast, north west England, took a severe battering during the storm surges of winter 2013/14. On 5th December, a 9.8m tide combined with a severe westerly gale and low atmospheric pressure produced a high-water surge 1.1m above its nominal height. Large waves attacked the dune frontage all along the coast, causing severe damage especially at Formby Point. Further surges occurred on 3rd January (10.1m) and 1st February (10.2m) but fortunately the wind had more of a southerly component and less erosion resulted. Sefton Council's Flood and Coastal Erosion Risk Management Team measured erosion losses in January at different places around Formby Point, Table 1 summarising the data they kindly provided. Based on the average loss along the 5km Formby Point frontage, I estimate that about 5.3ha (12.7 acres) of duneland were washed away, not including the effects of the February event.

Table 1. Approximate dune frontage losses at Formby Point after storm surges in December 2013 and January 2014 (source: Sefton Council)

Location	Loss 5th December (m)	Loss 3rd January (m)	Total (m)
Alexandra Road	4.5	1.2	5.7
Lifeboat Road	4.0	6.1	10.1
Victoria Road	11.7	1.3	13.0
Formby Golf Course	12.0	7.7	19.7

Formby Golf Course lost nearly 20m, while the National Trust dune frontage retreated by about 13m, leaving spectacular sand-cliffs. Hundreds of tonnes of rubble from the foundations of the National Trust car park collapsed onto the shore.

Meanwhile, to the south at Hightown, the Sailing Club premises were swamped and much of the sand deposited here in 2011 for a coast protection scheme was washed away, though it contributed to a useful rise in the beach level. Marram *Ammophila arenaria* rhizomes projecting from the beach showed that low dunes at the mouth of the River Alt had lost 20 – 21m by early February 2014.



Dunes at Formby Point on 6th December 2013 © P H Smith

Also at Hightown a weathered brick-rubble "shingle" beach was driven landwards and it remains to be seen what remains of its classic shingle flora. Further south, at Blundellsands, a rubble embankment tipped here after World War II to protect the coast was overtopped and eroded by at least a metre. One of the most upsetting sights here and elsewhere was the enormous quantity of plastic refuse washed up and then blown inland.

A frontal dune ridge on Crosby beach also lost an estimated 10m in the centre but, in absorbing wave energy, may have prevented the promenade to the rear being overtopped.

Between Ainsdale and Southport the foreshore is much wider, the dune frontage being protected by Birkdale "Green Beach". Nevertheless, the youngest dune ridge at Ainsdale, previously up to 2.5m high, was over-washed, losing much of its height, while a slightly older ridge further north was breached in several places, seawater deeply flooding the slack behind. At Birkdale, the Green Beach was flooded to a depth of at least a metre, tidal debris, including much plastic, being washed through the Alder *Alnus glutinosa* woodland to the rear.

Overall, these storm impacts were the most significant seen on the Sefton Coast in living memory, the loss of duneland being greater than the last major event in February 1990 when the National Trust frontage lost 13.6m.



# Rejuvenating Welsh Dunes - Twyni Cymreig Adnewyddol

## An update on progress December 2013

Mike Howe, Scott Hand, Emmer Litt, Duncan Ludlow, Graham Williams & Nick Thomas, Natural Resources Wales, David Carrington, Bridgend County Borough Council & Ken Pye, Kenneth Pye Associates Ltd.

In Sand Dune and Shingle Network Newsletter 14, we reported on attempts to generate more dynamic conditions on Kenfig National Nature Reserve near Swansea, by excavating 3.5ha of frontal dune, dune slack and parabolic ridge down to bare sand in winter 2011-12 (Phase 1; Howe et al., 2012a). Since then, we have continued work on Kenfig National Nature Reserve (NNR) and started dune rejuvenation programmes on the neighbouring Merthyr Mawr Warren NNR and on Newborough Warren NNR, Anglesey.

The Countryside Council for Wales (CCW - now Natural Resources Wales) received a second grant from Welsh Government to excavate a further 6.5ha on Kenfig NNR (Phase 2 works) and 1.5ha on Merthyr Mawr Warren NNR in winter 2012-13. The positioning, size, orientation and depth of the excavations followed recommendations given by Pye & Blott (2011a & b), with further advice on the Kenfig work given by Kenneth Pye Associates Ltd. (2012). The inland excavation works undertaken on Newborough Warren NNR to provide pioneer conditions for rare invertebrates and bryophytes were funded by CCW and Pond Conservation, following topographic advice given by Pye & Blott (2012).

All works were preceded by topographic surveys of the excavation sites (Kenneth Pye Associates Ltd., 2012 & 2013), surveys of the vegetation, and an assessment of the current vascular plant and lower plant interest. The bryological survey on Newborough Warren influenced the size and position of the excavation, with areas of turf supporting rare and scarce species being retained, and these should provide a source for colonizing newly-created bare sand. Post-excavation topographic surveys have already been completed.

## Kenfig NNR



Figure 1. Phases 1 and 2 of the rejuvenation work on Kenfig NNR, winters 2011-12 and 2012-13. Areas marked "existing 'bare' sand rejuvenation area" are Phase 1; other areas are Phase 2. Photo © Infoterra images.

Work on the 6.5ha excavation was undertaken from January to February 2013 in an area immediately to the north of the Phase 1 plot (see Figure 1). It was hampered from the outset by exceptionally high water levels which flooded both the access route and the plot itself and, as a result, the final excavation is probably less than 6ha. A different approach was adopted within the foredunes compared to the 2011-12 work, with four deep notches excavated (Figure 2) to help funnel the wind rather than removing vegetation from the entire foredune area, and the large volumes of sand removed from the notches also delayed progress. During a visit in June 2013, it was evident that the notches are both eroding and acting to funnel the movement of sand, and the original Phase 1 excavation is creating areas of pioneer slack (Figure 3). Both excavations (Figure 4) are in stark contrast to the stable dune conditions dominating the dune system.



Figure 2. Notches within the frontal dunes excavated during the Phase 2 works. June 2013 © M.Howe



Figure 3. Phase 1 excavation, 15 months after the excavation was completed June 2013 © M.Howe.



Figure 4. Phases 1 and 2 of the dune rejuvenation work on Kenfig NNR. June 2013 © M.Howe.

## Merthyr Mawr Warren NNR

The 1.5ha excavation was undertaken in December 2012, again during a period of high water levels, in an area previously disturbed in the 1960s and 1970s by gravel extraction (Figure 5). Using a combination of bulldozers and excavators, turf was stripped from the low lying areas within the parabolic dune, with the stripped material being used to build up and extend the arms of the parabolic dune. Over a ten-day period, approximately 12,000m<sup>3</sup> of sand was excavated and relocated. The finished excavation connects to an existing, high inland blow-out seemingly maintained by high visitor pressure (Figure 6).



Figure 5. Location of 1.5ha excavation on Merthyr Mawr Warren NNR. Note existing inland blow-out © Infoterra images



Figure 6. View of the completed excavation June 2013 © M.Howe

Further excavations were undertaken in November 2013 to complete the work postponed by the previous winter's high water levels. The area of potential slack habitat in original excavated area within the parabolic dune was doubled in size, to 100m x 50m. Excavated material was used to recreate an area of parabolic dune lost to earlier gravel extraction operations.

## Newborough Warren NNR

As at Merthyr Mawr Warren NNR, excavations were undertaken on inland dune areas rather than at the dune frontage, with work completed in three areas in March 2013 (Figures 7 and 8) resulting in approximately 3ha of bare sand. A bryophyte-rich turf was left intact towards the head of the dune slack in Area 2 to both safeguard scarce species and act as a spore source for the excavated slack.

## What Next?

High water levels at Kenfig NNR in winter 2012-13 made

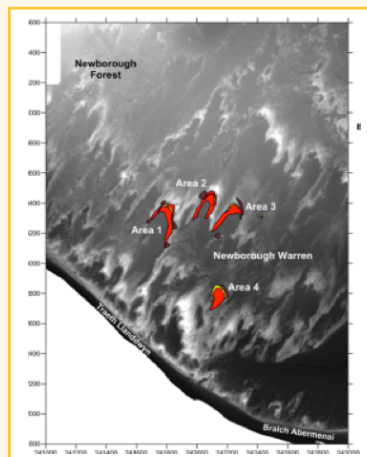


Figure 7. Sites of excavation (Areas 2, 3 and 4) on Newborough Warren NNR in March 2013 © Ken Pye Associates.



Figure 8. Excavation work in Area 2 of Newborough Warren NNR in March 2013 © M.Howe.

it difficult to access and excavate areas of flooded slack, and the immediate priority here is to 'tidy up' the Phase 1 and 2 works. We also hope to target works on the frontal dunes at Merthyr Mawr Warren NNR and Newborough Warren NNR, replicating the notch approach adopted for Kenfig Phase 2. However, a lack of funding has put this on hold until winter 2014-15 at the earliest.

In the meantime, we will be monitoring the mobility of sand and changes to topography, both within the immediate excavation footprint and surrounding dune areas, and colonization of the footprint by plants and invertebrates. We are also developing 3D terrain models using a combination of the detailed GPS data collected during the topographic surveys and contemporary aerial photography to provide accurate visual interpretation of pre- and post-excavation works, and for predictive interpretation of the next phases of the project.

## References

- Howe, M.A., Hand, S., Carrington, D. & Byfield, A. (2012a.) Rejuvenating Welsh Dunes - Twyni Cymreig Adnewyddol. *Sand Dune and Shingle Network Newsletter*, 14: 3-4.
- Howe, M.A., Litt, E. & Pye, K. (2012b.) Rejuvenating Welsh Dunes. *British Wildlife*, 24: 85-94.
- Kenneth Pye Associates Ltd. (2012.) *Kenfig dune rejuvenation trials – proposals for Phase 2*. Unpublished report for the Countryside Council for Wales.
- Kenneth Pye Associates Ltd. (2013.) *Newborough Warren sand dune habitat rejuvenation works initial topographic survey*. Unpublished report for the Countryside Council for Wales.
- Pye, K. & Blott, S.J. (2011a.) *Kenfig Sand Dunes - Potential for Dune Reactivation*. CCW Contract Science. 971. Countryside Council for Wales.
- Pye, K. & Blott, S.J. (2011b.) *Merthyr Mawr Warren - Potential for Dune Reactivation*. CCW Contract Science. 978. Countryside Council for Wales.
- Pye, K. & Blott, S.J. (2012.) *A geomorphological survey of Welsh dune systems to determine best methods of dune rejuvenation*. CCW Contract Science 1002. Countryside Council for Wales.



# Tentsmuir National Nature Reserve, Fife, Scotland

There is a long history with the Sand Dune and Shingle Network and Tentsmuir. It's an excellent site with a good developed history of well thought out management. We have typically provided coverage of our friend Tom Cunningham's newsletters with his great enthusiasm plain to see. We are pleased to be able to reveal a success story of a scrub removal project. Stewart Angus, Scottish Natural Heritage Coastal Ecologist visited Tentsmuir to provide his insight. Here is a summary of his thoughts;

"Most of the large dune systems of eastern Scotland are 'acid', because the sand is almost all mineral, as opposed to shell fragments. Apart from the dunes of the Grampian coast, most of these systems are succumbing to invasions by scrub and trees, including sea buckthorn, birch and self-sown conifers from neighbouring plantations. Many land managers now recognise this problem and devote considerable resources to removal of the scrub, notably the Forestry Commission and East Lothian Council, but cutting back the scrub is the easy bit: it is maintaining the cleared area free of scrub that poses the real challenge.

At Tentsmuir National Nature Reserve, Scottish Natural Heritage has succeeded in removing 95% of the scrub and conifers from the dune system, and keeping it clear, which probably makes this the most successful project of its type in Scotland. When I visited Tentsmuir at the end of May 2013 with Reserve Manager Tom Cunningham and Area

Officer Caroline Gallacher, I was immensely impressed with the success of their endeavours. The warm sunshine and the profusion of Small Copper butterflies helped, of course.

Though I was there primarily to look at the scrub clearance, I was possibly even more impressed with the interpretation of this popular reserve. The fascinating history of this site has been vividly told by the Time Line Trail.

The nature of my job is such that I usually visit sites that have problematic issues that require resolution, but here I was able to enjoy the tour and take great pleasure in seeing a challenging job brilliantly handled. Both site management and interpretation here are superb, and all involved are to be warmly congratulated on their success. Now, about this remaining 5% scrub ..."

It's always refreshing to hear such glowing reviews, thank you Stewart. The reserve manager, Tom Cunningham has received plenty of positive feedback and adds "We recently had 26 Eurosite people on Tentsmuir Point and I think every one of them (including Ian Jardine and John Baxter) were delighted with our work and gobsmacked with our dune flora. There are many, many proactive projects happening on Tentsmuir".

For more information on Tentsmuir and its management visit the excellent set of information on the site website at <http://www.nnr-scotland.org.uk/tentsmuir/>.

## Sand Dune Hydro-Ecology Group Meeting 2013

### Charlie Stratford- Centre for Ecology and Hydrology

The second meeting of the Sand Dune Hydro-Ecology Group, a thematic group of the Sand Dune and Shingle Network took place in South Wales between the 9th and 11th of September 2013. The meeting was organised by Charlie Stratford of the Centre for Ecology and Hydrology (CEH) and Debbie Allen from the British Geological Survey (BGS), and was supported by Liverpool Hope University, Natural England and Natural Resources Wales.

A total of 44 delegates attended the meeting representing England, Wales, Scotland, The Netherlands and Sweden. Their backgrounds covered many disciplines involved in coastal habitats including policy makers, site managers, specialist consultants and academic researchers. The three days of the meeting were a mixture of presentations, interactive sessions and field visits.

Invited presentations were given by Pieter Stuyfzand, Hans Schutten, Ken Pye and Ab Grootjans and these, along with a broad range of presentations given by fellow attendees, covered many of the key issues concerning sand dune habitats in Europe. Topics included hydro-ecological process understanding, development of policy for habitat protection, management for biodiversity, monitoring and mapping, and the use of remote sensing tools. Field visits were made to Whiteford Burrows and



Kenfig Sands, and each site helped to demonstrate much of what had been discussed in the presentations.

The delegates took home the knowledge that their work is contributing to the better understanding of dune coastal wetlands and is ultimately enabling improved management of the systems. It is hoped that the Sand Dune Hydro-Ecology Group will reconvene in 2015 to discuss further progress and, no doubt, a new set of aspirations.

Thanks are due to the many people involved in making this event such a success. If you would like the more detailed workshop report and accompanying presentations then please refer to The Sand Dune and Shingle Network website (<http://coast.hope.ac.uk/>).

# Dune dynamics and storm response on the North Lincolnshire coast

Joanna Bullard, Loughborough University

The dunes along the east coast of Lincolnshire between Donna Nook and Mablethorpe differ from many other coastal dunes around the UK in that they are currently advancing seawards. The rate of advance varies spatially and temporally, but has averaged c. 2 m yr<sup>-1</sup> over the past 150 years. In part the rate of advance is linked to the rate of retreat of the Holderness cliffs to the north of the Humber Estuary. During periods of storminess when cliff erosion rates increase, the dunes prograde more rapidly because the sands washed out of the cliff sediments are transported by longshore currents and supply the beaches and dunes to the south. There is a time-lag between the cliff erosion and the dune accretion; however large storms can also cause direct erosion of the dunes.

The recent major storm surge event on 5 December 2013 caused substantial erosion of the dunes on the Lincolnshire coast. This storm, during which water levels reached 5.8 m ODN in places, was one of the biggest on record. In the past 60 years only two storms have been of comparable size; in 1953 when water levels reached 5.6 m and in 1974 when they reached 4.7 m ODN. The dune fencing and brushwood thatching to the north of Mablethorpe, installed in April 2013 by the Environment Agency, was damaged and the dunes were eroded by 15-20 m forming a steep scarp face over 2 m high in places. A large patch of embryo dunes (1-1.5 m high) that has been expanding on the beach near Theddlethorpe since 2001 (recently described by Montreuil et al. 2013) was over washed during the storm surge and the foredune landward of this patch was also scarped up to a height of 2 m above the upper beach. Interestingly, whilst vegetation anchoring incipient foredunes further south along the beach was uprooted and destroyed, the vegetation on the embryo dunes survived remarkably intact and although it was flattened by the waves, it was not uprooted.



*Mablethorpe North End in April 2013 © Joanna Bullard*

The Natural Environment Research Council (NERC) has just announced funding for a research project based at Loughborough University which will study how rapidly the dunes at Mablethorpe and Theddlethorpe recover following the December 2013 storm surge. This one



year 'Urgency' project will quantify how rapidly the dunes recover both geomorphologically and ecologically and the results will be used to inform coastal planning and management strategies appropriate for coping with the increased storminess predicted in future climate scenarios. Seawards advancing coasts such as this are rarely studied which means little is known about their resilience to storms. In addition, this coast is dominated by offshore winds; these winds have often been considered unimportant for coastal dune formation, however recent research has shown that offshore winds can have a positive impact on dune construction through flow reversal and topographic steering effects. Researchers will use terrestrial laser scanning to construct three-dimensional digital terrain models and combine this with meteorological data and modelling to determine the relative importance of sand transporting winds from different directions in facilitating dune recovery.



*Foredunes at Mablethorpe on 7th December 2013 © Joanna Bullard*

More information about these dunes and the forthcoming research can be found in the following sources:

- Montreuil, A-L., Bullard, J.E. (2012) A 150 year record of coastline dynamics within a sediment cell: Eastern England. *Geomorphology*, 179, 168-185.
- Montreuil, A-L., Bullard, J.E., Chandler, J.H., Millett, J. (2013) Decadal and seasonal development of embryo dunes on an accreting macro tidal beach: North Lincolnshire, UK. *Earth Surface Processes and Landforms*, 38, 1851-1868.

NERC (2014) *Research on the effects of storm surges on sand dunes to aid coastal management*. <http://www.nerc.ac.uk/press/releases/2014/01-stormsurge.asp?cookieConsent=A>



# Preliminary Storm Damage Report, January 2014, County Clare, Eire

Congella McGuire and Tom Tiernan, Comhairle Contae An Chláir, Clare County Council



From mid-December 2013 the placid weather conditions which had been a feature of 2013 began to change. The river systems had filled up to a point where existing flood defences were being severely tested and there were a number of evolving localised flooding scenarios. A few days before Christmas the weather patterns changed with wind becoming the dominant force and storms arriving approximately every 3-4 days. The three most significant storms occurred overnight on December 26th -27th, through the early morning of January 3rd 2014 and through the morning of January 6th, 2014.

The most vigorous storm occurred through the early hours of Friday 3rd January 2014. The following storm three days later caused a comparable amount of damage but

this is probably because the stronger, earlier storm had compromised the defences.

The current estimate of the cost of remedial works to damaged public infrastructure amounts to €3,761,043, and this figure is expected to rise with continuing bad weather. The initial storm had a more dramatic effect inland, with the following storms more affecting the coastline. The severity of the storms was confirmed by very high tides, an extremely low pressure centre moving in a south-west to north-east direction off Ireland's west coast combined with 150mph gusts heading south-west to west. The severity of the storm resulted in text alerts and e-mail facilities being broadcast on several occasions, especially regarding warnings to the public of coastal flooding and unsafe conditions.



## Conservation on the military estate

John Houston



In the UK, as in many other European countries, military training areas safeguard a wide range of important habitats and species. Sites in the UK include small arms ranges, bombing ranges and armoured vehicle training sites. Far from being damaging to conservation interests the disturbances associated with military activity are often beneficial to the species which require disturbed and bare ground. We will feature the contribution of military sites to the conservation of dune and shingle habitats in our next newsletter.

The Ministry of Defence publishes an excellent annual report on the conservation on the military estate. The Sanctuary magazine illustrates the MOD's commitment to conservation projects and contains many interesting reports from dune sites around the UK. The 2012 edition, for example, reports on scrub and heathland management on Air Weapons Range, Tain, North East Scotland, one of the largest and most important dune systems in the UK within the Dornoch Firth and Morrich More SAC. The 2013 edition has articles on Dune Gentian *Gentianella uliginosa* at Air Weapons Range Pembrey and Petalwort *Petalophyllum ralfsii* at Castlemartin on the Pembrokeshire Ranges. Back numbers of Sanctuary (2004-2012) are available as PDFs at <https://www.gov.uk/government/publications/sanctuary>

The management of the defence estate has recently been reorganised. All conservation issues are now carried out through the Defence Infrastructure Organisation (See <https://www.gov.uk/defence-infrastructure-organisation-estate-and-sustainable-development> )

# The siting of stormwater outfalls as a limiting factor for local dune stabilisation on Narrabeen Beach, Sydney

Written by Nick Lewis

Sydney's beaches are an iconic visitor attraction and a major recreational resource, forming an integral component of the Australian culture and economy. Narrabeen Beach, located approximately 20km north of Sydney Harbour is no exception.



*Figure 1: Narrabeen Beach, Sydney  
(photo accredited to Nick Lewis)*

Recent observations suggest that the siting of stormwater outfalls appear to be significantly influencing localised stabilisation of dunes. Narrabeen Beach, part of Sydney's Northern Beaches region is a 3km long highly dynamic sandy beach system (Figure 1). Dunes, which back the beach for over 70% of its length, are subject to familiar pressures from hinterland development, beach erosion, as well as pressures from recreational use and access.

Despite landward barriers to dune growth and migration, such as residential development, roads and car parks, the dunes appear relatively stable (in the medium term) and form a backdrop to the dynamic erosion and accretion cycle of the adjacent beach. For example, dunes are periodically cut back and cliffed during storms, only to be built up again during periods of calmer weather.



*Figure 2: Stormwater outfall located on the beach Sydney  
(photo accredited to Nick Lewis)*

Although the dunes appear relatively stable, it is apparent that dune stability and the ability of the dunes to develop is being compromised locally, simply through the improper siting of stormwater outfalls.

A number of outfalls are present along the beach, which discharge stormwater from the adjacent catchment to the ocean following rainfall. Intense rainfall causes significant discharge from the outfalls leading to erosion and scour of the dune and beach. A number of the outfalls are sited seaward of the dune frontage on the beach (Figure 2).

However, at two locations outfalls are sited landward of the dune frontage, perched within the dune system. Where outfalls are sited within the dune system, scour from stormwater creates large scour gullies (see Figure 3). One such gully is over 2 meters deep and 6 meters wide.



*Figure 3: Erosion gully following a period of intense rainfall. Perched outfall shown by arrow Sydney  
(photo accredited to Nick Lewis)*

The siting of the outfalls along Narrabeen Beach appears to be a key factor limiting the localised dune stability. The discharge of stormwater following rainfall removes sediment and inhibits vegetation growth. A simple feature of the design, i.e. to place the outfall within the dune system as opposed to on the beach has been shown to affect almost 200 square meters of dune at each outfall.

## Editorial

Do any Network members have experience of similar situations in the UK or Europe?

Please send us your experience, or contribute to a discussion using LinkedIn.



## Recent Publications

### Management

Makowski, C., Finkl, C. W., and Rusenko, K. (2013) Suitability of recycled glass cullet as artificial dune fill along coastal environments. *Journal of Coastal Research*. **29**(4), 772-782.

Silviera, T. M., Santos, C. F., and Andrade, F. (2013). Beneficial use of dredged sand for beach nourishment and coastal landform enhancement –the case study of Troia, Portugal. *Journal of Coastal Conservation* **19**, 825-832

Tresca, A., Ruz, M.H., and Grégoire, P. (2014) Coastal dune development and sand drifting management along an artificial shoreline: The case of Dunkirk harbour, northern France. *Journal of Coastal Conservation*. **17** (4) 1-10

### Modelling

Barrio-Parra, F., and Rodriguez-Santalla, I. (2014) A free cellular model of dune dynamics: Application to El Fangar Spit dune system (Ebro Delta, Spain). *Computers and Geosciences* **62**, 187 – 197

Yizhaq, H., Ashkenazy, Y., Levin, N., and Tsoar, H. (2013). Spatiotemporal model for the progression of transgressive dunes. *Physica A* **392**, 4502-4515

### Monitoring

Drius, M., Lalavasi, M., Acostar A.T.R., Ricotta, C., and Carranza, M.L. (2013) Boundary based analysis for the assessment of coastal dune landscape integrity over time. *Applied Geography*. **45**, 41-48

Pelletier, J.D. (2013) Deviations from self-similarity in barchans form and flux: the case of the Salton sea dunes, California. *Journal of geophysical research-Earth surface*. **118** (4), 2406-2420.

Pye, K., Blott, S. J., and Howe, M. A. (2014) Coastal dune stabilization in Wales and requirements for rejuvenation. *Journal of Coastal Conservation* **18**, 27-54

Splinter, D. K., Carley, T. J., Golshani, A., and Tomlinson R. (2014). A relationship to describe the cumulative impact of storm clusters on beach erosion. *Coastal Engineering* **83**, 49-55

### Vegetation

Calvão, T., Pessoa, M, F., and Lidon, F, C. (2013) Impact of human activities on coastal vegetation- a review. *Environmental Journal of Food Agriculture* **25** (12), 926-944

Damgaard, C., Thopmsen, M. P., Borchsenius, F., Nielsen, K. E., and Strandberg, M. (2013) The effect of grazing on biodiversity in coastal dune heathlands. *Journal of Coastal Conservation* **17**, 663-670

Del Vecchio, S., Acosta, A., and Stanisci, A. (2013) The impact of *Acacia saligna* on coastal dune EC habitats. *Competes Rendus Biologies* **336**, 364-369

Martins, M. C., Neto C. S., and Costa J. C. (2013) The meaning of mainland Portugal beaches and dunes' psammophilic plant communities: a contribution to tourism management and nature conservation. *Journal of Coastal Conservation* **17**, 279-299

Menkis, A., Ihrmark, K., Stenlid, J., and Vasaitis, R. (2014) Root-associated fungi of the *Rosa rugosa* grown on the frontal dunes of the Baltic Sea coast in Lithuania. *Microbial Ecology* **69**, 1-6

Nourisson, D. H., Bessa, F., Scapini, F., and Marques, J. C. (2014) Macrofaunal community abundance and diversity and talitrid orientation as potential indicators of ecological long term effects of a sand-dune recovery intervention. *Ecological Indicators* **36**, 356-366

## Rosebay Willow herb discussion on LinkedIn



Earlier in the year we had a request regarding the control and management of Rosebay Willowherb *Chamerion angustifolium* and sought site managers' experience through a LinkedIn discussion group. Some interesting points were made. You can find the group at this link:

[http://www.linkedin.com/groups/Rosebay-Willowherb-information-request-6609856?trk=groups\\_management\\_announce-h-dsc](http://www.linkedin.com/groups/Rosebay-Willowherb-information-request-6609856?trk=groups_management_announce-h-dsc)

We could make more use of LinkedIn discussion groups. If there is a topic you believe that needs highlighting, let's get this started. Send a request to [dunes@hope.ac.uk](mailto:dunes@hope.ac.uk). We hope to be able to offer a platform for academic and practitioner discussions.

## European Dune Network and the EUCC

We would like to highlight this Newsletter's accompanying booklet for the European Dune Network. The amount of content we had to fit into Issue 18 forced us to separate the EDN update from the issue.

The booklet itself is packed. You can find updates from key Life+ sites and a report from Project Noordwest Natuurkern provided by our friends Marieke Kuipers, Jenny van Rijn, Leon Terlouw & Ina Roels, Watercompany PWN.

You can find more about the EDN and The EUCC at our website using the following link. <http://coast.hope.ac.uk/ourprojects/partnersandcollaborations/>

## Coastal and Marine Research Group of the Royal Geographical Society

The Coastal and Marine Research Group is part of the Royal Geographical Society (RGS). The RGS is a learned society and professional body for geography and geographers. Founded in 1830, it is a world centre for geography: supporting research, education, expeditions and fieldwork, and promoting public engagement and informed enjoyment of our world. The Coastal and Marine Research Group (CMRG) was formed in 2004 and recently granted full research group status by the RGS in 2010.

Following the achievement of 'full' research group status, the CMRG is entering a new phase. This article aims to update you about some latest developments, and also to invite you to express your interests and play a role in the development of the research group.

Firstly, we're glad to announce the launch of our new website, <http://coastalmarineresearchgroup.wordpress.com/> where you can find details of the group's initiatives thus far and contact details. This is one of a number of vehicles which we plan to use to build contacts amongst the group. Look out for the monthly profiles of group members and please consider if this is an opportunity you want to use to promote your research or studies.

One highlight of our year is the Royal Geographical Society Annual Conference, which in 2014 is on 26-29 August in

London – see <http://www.rgs.org/HomePage.htm>

This year we have scheduled a session on 'Ecosystem based management' and joint session with the Planning and Environment Research Group on 'The impact agenda and science-policy collaboration.' In addition, the 2nd Marine and Coastal Policy Forum will take place on 18-20 June 2014 in Plymouth, UK as a jointly badged event with the University of Plymouth and CMRG.

A characteristic of the group that we are particularly proud of is the way in which we span human, physical and cultural branches of geography and include practitioners working on applied topics in oceans and coasts. Our next AGM will be at the annual conference, and we welcome all those with an interest in researching oceans and coasts to attend and consider playing a role on the committee.

The Coastal and Marine Research Group always welcomes new members. If you are a member of the RGS, you can join our group by completing the online application form available on the CMRG website. If you are not a member of the RGS, you can still join the group for free by e-mailing Tim Stojanovic ([tas21@st-andrews.ac.uk](mailto:tas21@st-andrews.ac.uk)).

Paul Rooney (Secretary and Liverpool Hope University) and Tim Stojanovic (Chair and St Andrew's University) – Coastal and Marine Research Group

### EUCC Conference and Workshop in France- 17-19 June 2014

To celebrate the 20th anniversary of EUCC France and the 25th anniversary of Coastal & Marine Union (EUCC) both associations are organising a field workshop and an international symposium dedicated to the Integrated Management of Coastal Dunes.

The events are not only aimed at dune scientists, experts and managers from all over Europe but also to policy makers, civil society representatives and nature protection associations to exchange know-how and experiences on coastal dunes. More Information can be found on the dedicated webpages at <http://euccmerlimonten.wordpress.com/programme/international-symposium/>

The event will be held in Merlimont, Nord-Pas de Calais with the international symposium on 17th June, the field workshop on 18th June and discussions on 19th June. The organization is supported by the Office National des Forêts (ONF), the City-Council of Merlimont, the Conservatoire du Littoral, EDEN 62

### Littoral 2014: Facing Present and Future Coast Challenges - 22-26 September 2014

Littoral 2014 will be hosted by Klaipeda University, Lithuania, and celebrates the 20th anniversary of the EUCC Baltic States Office.

Littoral 2014, following the structure of previous coastal conferences, will address a wide range of coastal research, conservation and management issues and will provide opportunities for networking between coastal researchers and practitioners from all over Europe. Information on the programme, the sessions and side events is provided at <http://balticlagoons.net/littoral2014/>.

There will be a special session on coastal dunes convened by key network members Maike Isermann, Pat Doody and Paul Rooney. There are also two post-conference options to visit the Nemunas Delta, Curonian Lagoon and Curonian Spit.

**This newsletter has been compiled by Tom Marshall, John Houston and Paul Rooney**

Contact [dunes@hope.ac.uk](mailto:dunes@hope.ac.uk)

Website <http://coast.hope.ac.uk/>

Cover Photo: Tenstmuir National Nature Reserve © Ken Barry Photography/ Scottish Natural Heritage

The Sand Dune and Shingle Network is based in the Department of Geography and Environmental Science at Liverpool Hope University







# European Dune Network

*Sharing experience across borders*

## Newsletter Number 5: March 2014

Welcome to our fifth European Dune Network update. In previous newsletters we have explained that the concept of a European Dune Network arose from discussions at international conferences and it was given some substance in 2010 with the support of the Coastal and Marine Union (EUCC). However, at present, it has no formal structure and is maintained only through communication and networking so let's keep talking and exchanging experience.

The UK Sand Dune and Shingle Network based at Liverpool Hope University is one of several national coastal networks. It has, however, developed a good international following and is keen to increase its communication with European colleagues. We will help support and promote activities which help to disseminate knowledge on the nature and conservation of European dune habitats.

### The New Biogeographical Process – why habitat networks are important

To assist with the delivery of the EU Biodiversity Strategy the European Commission launched a programme of biogeographical Natura 2000 seminars to exchange experiences and best practices, identify common objectives and priorities and enhance cooperation and synergies in managing Natura 2000.

The seminar process for the Atlantic biogeographical region was led by The Netherlands. A scoping document prepared by the European Topic Centre for Biological Diversity was used by Member States to select habitat types for discussion at an expert workshop, which in turn would make recommendations to a Natura 2000 seminar. For the Atlantic region, coastal and dune habitats (including estuaries) were selected for a workshop chaired by Jean-Louis Herrier and Bernd Netz.

The results of the process are published on the pages for the New Biogeographical Process [http://ec.europa.eu/environment/nature/natura2000/seminars\\_en.htm](http://ec.europa.eu/environment/nature/natura2000/seminars_en.htm). It should be of interest to all members of the Network.

### Sand dunes of the Atlantic Biogeographical Region

The Atlantic Natura 2000 workshop and seminar highlighted the continued threats to dune habitats, set out the key issues and made recommendations for action. The European Dune Network should be making full use of the report to support new initiatives and networking.

#### What are the issues?

Three key issues were identified: large scale loss of natural habitat, interference with natural dynamics and lack of an integrated approach. Additional issues raised at the final seminar were invasive alien species, climate change, communication, appropriate sediment management and connectivity.

### Large scale loss of natural habitat

Pressures such as urbanisation have led to large scale loss and fragmentation of dune areas leaving the remaining areas too small and isolated for natural processes to maintain the viability of less mobile species. The report suggests solutions through the removal of obsolete infrastructure, plantations and other artificial vegetation and by establishing the conditions for new dune formation and calls for habitat creation to be included in national and regional planning for climate change adaptation. Opportunities may exist alongside activities such as beach nourishment and coastal realignment.

### Interference with natural dynamics

Sand mobility is an integral component of a healthy dune system. Marram planting and afforestation have fixed large parts of the dunes and there is now a need to consider remobilisation of dunes and to allow localised marine erosion to occur. There is a need to recognise that favourable conservation status of dune habitats must include the dune forming processes. It is important to accept that it is not necessary to maintain the same habitat in the same area. The problem of securing local acceptance for some restoration methods is accepted.

### Lack of an integrated approach

There is a need to take a holistic, multi-use, view of dune systems to reach a balance between coastal defence, drinking water production, recreation and conservation. Integrated Coastal Management guidelines could be used to promote an ecosystems-based approach to management planning. Linked to this, the workshop proposed the sharing of good practice through an 'Atlantic platform'.

The report recommends:

- The adoption of 'climate change adaptation through coastal habitat restoration' and 'dynamic coastal management' as priorities for ERDF funding in the operational programme for coastal regions; and
- The establishment of an expert-network of government conservation agencies to encourage the sharing of information and practice. There is a need to develop integrated projects to make best use of EU funding streams such as LIFE, Interreg and ERDF.

The biogeographical reports make a specific reference to the value of LIFE projects. The European Commission has established a specific communication platform to assist this process and should be actively used by LIFE projects to communicate relevant results and experience. We have registered the UK Sand Dune and Shingle Network on the platform and would encourage others to do so as well.

Further information is available at [http://ec.europa.eu/environment/nature/natura2000/seminars\\_en.htm](http://ec.europa.eu/environment/nature/natura2000/seminars_en.htm) and [http://ec.europa.eu/environment/nature/natura2000/platform/index\\_en.htm](http://ec.europa.eu/environment/nature/natura2000/platform/index_en.htm)

## LIFE Focus



Established in 1992 the EU LIFE programme is the only dedicated EU fund for the environment. Since 2007 the LIFE+ programme has supported several nature projects across Europe addressing dune conservation. A number of ongoing projects are featured here and we will continue to follow the programme. On 1st January 2014 the new LIFE regulation came into force guaranteeing the continuation of the funding through to 2020.

There are significant changes to the programme, however, as climate change is now included as a major sub-programme and there will be support for larger, regional scale, projects called Integrated Projects. The traditional LIFE projects will continue to be funded. The new regulation and all other information on the LIFE programme, the projects and publications can be found at <http://ec.europa.eu/environment/life/>

## New LIFE for Danish dunes

Following the success of a 2002 LIFE project the Danish Nature Agency started a second project in 2013. The project 'Restoration of Danish Coastal Habitats' will operate on 11,140 ha along the 400 km west coastline of Denmark, one of the finest areas of dune habitats in Europe and the only habitat in Denmark where forest is not the natural climax vegetation. The habitat mosaic includes well-preserved fixed dune vegetation and humid dune slacks. The project areas are threatened, however, by a lack of natural dynamic processes and the invasion of coniferous species, the target of the earlier project. Other threats include the fragmentation of habitats and loss of breeding and foraging areas for key species.



Heath and invading *Pinus mugo*, Store Tyvbak © Paul Rooney

The project will improve the conservation status of the coastal dune habitats, will significantly reduce the threats to the plant species *Ligusticum scoticum* and *Calystegia soldanella* and will improve the conditions for a range of animal species, including Natterjack Toad, Sand Lizard, birds and invertebrates. Expected results are: removal of invasive species including Japanese Rose *Rosa rugosa* from 10 -100 ha, improvement of hydrological conditions, protection of breeding birds and removal of over 100 ha of plantation woodland to allow return of fixed dunes and humid dune slacks habitats. The removal of commercial plantations in the open coastal dune habitats will reduce habitat fragmentation.

Contact person: Uffe Strandby [nst@nst.dk](mailto:nst@nst.dk)

## SandLIFE-restoration of sandy soils in southern Sweden

In Sweden a project got underway in 2012 to address the conservation of coastal and inland dunes in the southern counties. In many parts of the region the sandy-soil habitats are living remnants of a traditional lifestyle and historical landscape. In the 18th century, most of the woodlands and trees were removed, leading to wind erosion and massive sand drift. Many of the forests now growing in these areas were replanted to remedy the problem. Abandonment of traditional farming has led to invasion by trees, scrub and coarse grassland. The project will address problems on 23 Natura 2000 areas (3,350 ha) on sandy soils in southern Sweden using tried and tested restoration techniques, including the removal of conifer plantations (*Pinus mugo* and *Pinus nigra*), creation of bare sand and removal of invasive Japanese Rose *Rosa rugosa* and management of heather. The project will have an active aware raising programme to inform local people about the value of the work.

The expected results are improved habitat condition, creation of new areas of habitat and a focus on the flora, fauna and fungi of open sand areas. Actual targets are: woodland clearance (316 ha); creation of bare sand areas (391 ha); management of encroachment (139 ha); removal of invasive Japanese Rose (26 ha); and management of heather (26 ha). The project will publish a manual on the management of sandy-soil habitats and will disseminate its results and recommendations to a European audience.

Further information on [www.sandlife.se](http://www.sandlife.se) and project manager Gabrielle Rosquist [gabrielle.rosquist@lansstyrelsen.se](mailto:gabrielle.rosquist@lansstyrelsen.se)



## Amsterdam Dunes - Source for Nature



**Published report of the LIFE+ project expert meeting:  
19th - 20th April 2013**

As reported in Newsletter 17 a number of experts in dune management from six countries took part in a two day workshop and excursion organised by Waternet (Amsterdam Watersupply Dunes) as part of the LIFE+ project 'Amsterdam Dunes, source for nature' (LIFE11 NAT/NL/000776). The meeting was a very useful opportunity for the project managers to assess whether their approaches to dune restoration were feasible and justified. The results of the discussions are published in a report which includes direct quotes from the invited experts. The summary includes the following points of interest:

- Grey dunes habitats are under threat mainly due to grass and shrub encroachment. A surplus of nitrogen deposition is an important factor.
- Rabbit grazing plays an important role in the recovery of the grey dunes. However, their populations are very variable and, therefore, not reliable.
- Shallow sod cutting is an effective management technique when applied on a small-scale in grass and shrub encroached habitats.
- Destabilisation of dune systems through the creation of new blow-outs can be an effective management tool. It can generate areas of bare sand helping to rejuvenate the landscape.
- Conifer plantations should be removed (including stumps and litter layer) to restore open dune habitat and landscape value. Clear communication is important to make people understand the benefits arising from this restoration measure.
- To control invasive *Prunus serotina* the complete removal of roots and seed bank is required to prevent re-establishment. Although the strategy is supported, the operational area is sometimes too restricted, especially when it has to avoid damaging surrounding vegetation such as Sea Buckthorn. In this case small scale scraping and encouraging dynamics may sufficiently increase biodiversity.

The report is available at [https://www.waternet.nl/media/602547/rapport\\_expertmeeting\\_life\\_awd\\_19-20april2013.pdf](https://www.waternet.nl/media/602547/rapport_expertmeeting_life_awd_19-20april2013.pdf)

## LIFE FLANDRE- Flemish and North French Dunes Restoration

The coast between Dunkirk (France) and Westende (Belgium) is characterised by broad sandy beaches, natural foredunes, parabolic dunes with humid slacks and low, gently undulating older 'fossil' dunes formed between 3,000 BC and 800 AD. The dune soils are rich in lime, except for the 'fossil' dunes, which are heavily decalcified. In the 20th century, the dunes on both sides of the border were severely degraded by urbanisation, water extraction, recreational use, dune stabilisation, invasive species, increasing agricultural use in the transitions between dunes and polders, and the decline of traditional grazing and mowing, resulting in scrub encroachment.

The 5-year project (2013-2018) aims to consolidate the Natura 2000 network by actions to recover populations of target species and to restore characteristic dune habitats. It will achieve this by land purchase, management planning, habitat restoration, awareness raising activity and by strengthening cooperation between Belgian and French public authorities. The project will draw up a cross border management plan with a legal basis for transnational cooperation for the management of the dunes as a European natural park.

In Belgium the project will purchase 30 ha of dunes and prepare management plans for 93 ha of dunes purchased by the Agency for Nature and Forests between 2005 and 2010 across five sites which will be established as Flemish nature reserves. Restoration work will focus on humid dune slack habitat including the creation of aquatic habitat for Great-crested Newt *Triturus cristatus* and Natterjack Toad *Epidalea calamita*.



In France the project will purchase 58 ha of dunes to be added to the existing sites Dune Dewulf, Dune Marchand, Dune du Perroquet and Dune fossile de Ghyvelde. Restoration work will focus on 65 ha of humid dune slacks and grey dunes, improving the habitat of the Narrow-mouthed Whorl Snail *Vertigo angustior* and also providing habitat for Great-crested Newt and Natterjack Toad. New footpaths will also be created to reduce the negative impact of uncontrolled access.

The project will improve ecological cohesion and connectivity of the network of dune sites on both sides of the border and increase public awareness of the natural heritage value of this fragile dune area.

Contact: Jean-Louis Herrier [jeanlouis.herrier@lne.vlaanderen.be](mailto:jeanlouis.herrier@lne.vlaanderen.be) Project information in English can be found at [http://www.natuurenbos.be/nl-BE/Over-ons/Projecten/Flandre/Flandre%20ENG.aspx#.Uv4u9mJ\\_vTo](http://www.natuurenbos.be/nl-BE/Over-ons/Projecten/Flandre/Flandre%20ENG.aspx#.Uv4u9mJ_vTo)

# Revitalising the Noordduinen, The Netherlands

The Noordduinen is a narrow band of dunes on the Dutch mainland lying between Callantsoog and Den Helder. It was formerly used as a military training area for anti-aircraft guns and tanks. The layman's report of this LIFE project, led by Landschap Noord-Holland, describes the removal of military infrastructure to restore dunes, turf stripping to rejuvenate wet meadows and slacks and combating the problem of invasive Japanese Rose *Rosa rugosa*.

The removal of the concrete infrastructure of the military base was completed as planned but it exposed such a large area of bare sand that there were problems with sandblow. This was brought under control by the application of straw mulched into the surface, a common-used technique in the Netherlands (also by farmers in the bulb fields) and preferable to using fences to control drift. Once the risk of large scale sand blow was removed small areas of straw were removed to encourage localised blowouts. Reed screens and Marram planting was used to form low dunes which would in time become grey dunes. The project has shown that it is possible to accommodate open dunes near housing and road infrastructure by taking a cautious and small scale approach to the remobilisation.

Sod-cutting was used to rejuvenate wet dune meadows by removing nutrient rich upper layers and lowering the overall surface to restore humid slack conditions. Because of the coast protection concerns in the Netherlands it was not allowed to remove the material from the site, instead it was used to create a new line of dunes to the east of the site. The project tried to find the best method to combat the spread of Japanese Rose which covers c. 6 ha of the grey dunes. It proved difficult to find an effective method and a combination of mowing, cutting and herbicide application was used to weaken and eventually kill the plant. However, there was local concern about the use of herbicides. A meeting of experts from the Netherlands, Belgium, Germany and the UK

was held on 28th June 2013 in Callantsoog on the problems of invasive woody species in European dunes. *Rosa rugosa*, an Asiatic species, is salt tolerant and its roots can penetrate to 2.5 m so it is hardly affected by drought. In Noordduinen the plant was spreading at 5% a year, from 1-2% of land cover in 2005 to 2-3% of land cover in 2013.

In trials the best results were obtained by cutting before the middle of March and treatment of young leaves with Triclopyr. This has to be repeated. The result of the trial was 100% success but when used more widely in 2012 the success rate was only about 50% perhaps due to weather conditions and the time between cutting and spraying. Some of the methods used to control *Rosa rugosa* include:

- Grazing with Highland cattle, sheep and goats
- Continuation of herbicide treatment
- Covering with plastic to suffocate the roots
- Digging out the entire plant including the roots
- Prevention of any new planting for amenity

One of the views expressed in the report is that it is better to try to stop a new invasive species than anticipating the outcome of research and having to restore larger areas. Field experience and research should go hand in hand. Sharing knowledge is also essential and can help avoid expensive mistakes.

Information on the project including the report of the meeting of 28th June 2013 on invasive, non-native species can be found in the 'English' section at <http://www.noordduinen.info/>

## Zwin Tidal Area Restoration, Belgium

The ZTAR LIFE+ project is making good progress with its actions to improve the habitats of the Zwin tidal salt marsh and dune complex in Belgium with 125 ha of tidal saltwater lagoon, gullies and salt marshes, 55 ha of sand dunes and tidal sandy beach and a further 27 ha in the Netherlands. The project runs until the end of 2015 and there are plans to hold an international congress about the management of dunes and estuaries to share experience. We will let Network members know when there are more details.

The ZTAR project has several actions including creating more aquatic habitat for Natterjack Toad, restoring a number of islands in the lagoon used by breeding birds such as Common Tern *Sterna hirundo* and Avocet *Recurvirostra avosetta*, reestablishing grazing on marshes and dunes, restoring the tidal flows in to the Zwin gully and rejuvenating the salt marsh by removing a layer of silt and sea couch grass to allow pioneer plants to return.

The main problem affecting the Zwin has been the gradual

filling up of the lagoon with sediment probably originating from erosion of the sandy beach and foredunes, so that the loss of biodiversity is an example of coastal squeeze as a consequence of climate change. More information, including a flyer in English, can be found at [www.lifenatuurztar.be](http://www.lifenatuurztar.be)



# Dynamics in Dutch dunes: Project Noordwest Natuurkern

Marieke Kuipers, Jenny van Rijn, Leon Terlouw & Ina Roels, Watercompany PWN

The project Northwest Nature-core aims to recreate mobile dunes conditions and increase the area of dune grasslands and dune slacks in the National Park Zuid-Kennemerland (NPZK). To create the conditions for self-sustaining sand drift, gulleys have been created at five spots in the frontal dunes between Bloemendaal aan Zee and IJmuiden to allow the wind to do its natural work. Inland and in the extension of these trenches, five large dunes have been stripped of vegetation to remobilise the dunes.



Top Photo: Current situation c. Harm Botman

Bottom Photo: Future situation c. Animation Ulco Glimmerveen

The project, managed by the Watercompany PWN, meets the aims of the plan for the Natura 2000 site Kennemerland-Zuid. The project is financed by provincial funds and the EU LIFE+ programme as part of the LIFE project 'Dutch Dune Revival'. Implementation took place between autumn 2011 and April 2013.

Project Northwest Nature-core has targets to extend the area of mobile dunes by 16 ha and to extend and improve the condition of grey dunes and humid dune slacks. The project tackles the problems of a lack of dune dynamics (which leads to the ageing and acidification of the grey dunes) and the presence of an artificial dune lake, Cremermeer, of little conservation value.

The recovery of dynamic dunes is achieved by creating gaps to funnel sand and salt spray through the foredunes and by reactivating the drifting of underlying parabolic dunes. The trenches are 100 to 150 m wide at the top and are dug in a V-shape to 6 m +NAP (Dutch Ordnance Datum) rising to

9 m +NAP. The trenches extend the wind and salt effect to the reactivated parabolic dunes lying directly inland. The movement of the parabolic dunes will also create embryo dune slacks.



Zoning map project Noordwest Natuurkern.

The conditions for dune slack formation are created by turf-stripping with the material used to fill in much of the artificial lake to improve the wetland habitat. Fish (carp) were removed from the lake, steep sides re-profiled and shallow areas created.

## Why dynamic dune management and why here?

Noordwest Natuurkern was one of the few sites along the Dutch mainland where this type of work would be possible. The dune is sufficiently wide to guarantee the safety of the hinterland and it is a quiet nature area without urban infrastructure. Over time, people have started to think differently about the function of the foredune areas to consider giving room for the wind so that this area can act as a "motor" of dynamic influences and processes for the inland dunes. With a greater influence of the wind and more salt deposition it may be possible to create a sustainable remobilisation.

## Sustainable climate-resilient management

Sand movement on a sufficient scale ensures that the dune is rejuvenated, does not age nor become acidified. The 'sand spray' spreads lime in different amounts across the surrounding area, thus achieving a great variation in the amount of lime. This leads to an increase in variation in environments and species, each with their own requirements. As the parabolic dunes move, blow-outs are created on the windward side down to the groundwater. If the groundwater level rises due to climate change, the height of the dune slack grows with it and the variation is maintained. This is important, as the groundwater level is expected to change in the future, due to both a rise in sea level and changes in the rainfall pattern. Using climate change predictions of sea level rise of 35-85 cm by 2100, the slacks just behind the near shore area will become much wetter with more open water. Then there is also a predicted increase in rainfall. According to the climate atlas for Noord-Holland, this could possibly be 50 mm, i.e. an average rise in the water table of around 15 cm.

## Impact on species and habitats

In previous remobilisation projects (Verlaten Veld 1998, Huttenvlak 1999 and Bruid van Haarlem 2002/2003) the recovery of the floristic values was particularly striking. In all the slacks there was a good return of dune annuals thanks to the richness of lime from the sand blowing over from the remobilised dunes. Reactivation of parabolic dunes in earlier projects has been successful, re-establishing dynamics and mobilising sand drift, but after a number of years the sites begin to stabilise again so projects have a limited life-span of 10 to 15 years. However, this project should be more long lasting as it is taking place near the shore, where the influence from the sea is strongest. Also, in the first years after completion, there will be follow-up management to remove the remains of the former landscape and vegetation. No plant species should be lost by the implementation of this project. The sand drift locations were chosen so that the most valuable dune slack sites were not endangered and in other areas sand drift is expected only to be sustained for about 50 years. In the long term, parts of the slack floor can be adapted to new groundwater levels. Without any intervention, it would be expected that large parts of the slack will become too wet in the future and thus unsuitable for damp slack vegetation.

## Organising public support

The project was conceived in 2005 by PWN, Natuurmonumenten and the District Water Control Board Rhineland, discussed in 2007 by the Advisory Committee and the Consultative Group of the NPZK and further developed in 2008 with public opinion surveys. People were curious to find out about this new nature.

The plan was submitted in 2009 to the LIFE+ programme and the grant was awarded in 2010. Support was also given from the Ministry of Agriculture, Nature Management and Fisheries, the Province Noord-Holland, the National Park Zuid-Kennemerland, the District Water Control Board Rhineland, Stichting Duinbehoud and the districts of Velsen, Bloemendaal and Zandvoort.

## Working around constraints

A number of constraints were included in the project design and implementation. The local authority had to be sure that the sand drift would not cause a nuisance or weaken coastal defences. In fact the project became part of a pilot project in the region. To allow for the project the line of the so-called 'primaire kering', the front chain of dunes for flood control and protection has been moved eastward (inland). The location of the excavations avoided disruption to WWI and WWII bunkers of historic interest, although during the construction works some unknown bunkers were discovered. Similarly, investigations showed that the project was unlikely to have an impact on archaeological interest. To accommodate the sand drift the recreational routes had to be changed. The beach access path had to be relocated about 400 m southward and will run through to the beach at a much lower level so it is an improvement.

## Value of the nature and landscape

Discussions with conservationists about whether the project should go ahead concluded that the remobilisation would help the dunes to adapt to climate change and the works would be justified. The Zuid-Kennemerland dunes is also a geological

monument and dynamic dunes are part of that character. In 2005, the reactivated 'Bride of Haarlem', was recommended as a geological monument.



## Realisation of the project

After the details of the project were agreed and the area checked for unexploded ordnance the first stage began in January 2012 with the removal of vegetation from the inland parabolic dunes. The five excavations in the frontal dunes were completed over the winter of 2012-2013. Uses were found for the 220,000 m<sup>3</sup> arising from the excavation works to fill part of the Cremermeer, to strengthen weak spots in the foredune and to raise the beach in Zandvoort.



*Breach in frontal dunes © PWN*

## Communication

As well as consulting the various authorities, an extensive communication and information programme was provided for the local community. Communication was in the form of signs, newsletters, websites, excursions, presentations and through the visitor centre 'de Zandwaaier'. Local, regional and national media were kept informed and gave publicity to the first cut through the dunes on 5th October 2012.





## Grazing on Dutch dunes



Open dune landscapes in the Netherlands are becoming more closed in their character with the development of tall, broad-leaved grasses and shrubs. To restore this open dune landscape large coastal dune areas are grazed by cattle, horses, sheep and goats. The results of a field survey has been published (in Dutch with an English summary) which looks at the effects of grazing in coastal dunes over a 30 year period using over 100 paired plots (grazed v. ungrazed). The authors make a number of general conclusions:

- Introduced grazing with cattle, horses and/or sheep is a functional measure to decrease height and biomass of broad-leaved grasses
- Introduced grazing leads to more open sandy patches and a low, but more uniform vegetation structure
- In general grazing does not lead to a more herbaceous vegetation or higher densities of flowers and therefore does not seem to facilitate flower visiting insects in coastal dunes
- Within 10-30 years grazing hardly has an effect on soil chemistry and probably does not yet have an (indirect) ecological effect
- Grazing facilitates conservation and recovery of rabbit populations
- Breeding bird populations of open dune as well as shrub and woodland tend to decrease with cattle grazing in low densities, but might profit from grazing with horses, ponies and sheep (potentially combined with cattle) in higher densities

In the last 30 years, grazing on Dutch coastal dunes has been applied mostly year-round and with relatively low densities of grazers. It is hypothesized that temporal grazing with higher densities of grazers outside the breeding season might have a more positive effect on animal species in open coastal dune areas.

## Coastal & Marine Union (EUCC) celebrates 25 years

Twenty five years ago, in 1989, the European Union for Dune Conservation (EUDC) was established to help bridge the gaps between science and management and to raise awareness of the urgent need to protect and conserve the coastal dunes of Europe. Over time the area of interest widened with first the European Union for Coastal Conservation and then the Coastal & Marine Union (EUCC).

The EUDC itself grew from the international conference on dune management, organised by Albert Salman and colleagues at Stichting Duinbehoud in Leiden in 1987. Several members of the current European Dune Network were at that meeting, and it is always seen as the starting point for the networking we have today.

Following the success of the meeting in Leiden other dune networking events were held in Seville, Spain and Galway, Ireland before the establishment of EUCC and the beginning of a broader agenda. EUCC has championed the value of Integrated Coastal Zone Management through demonstration projects, advocacy and working with Member States. The Dutch government has been a good supporter of EUCC and together they organised the 1st European Coastal Conference in 1991. This in turn led to the EU supported Demonstration Programme for ICZM and later, 2002, to the EU Recommendation on CZM which, for now, is the main guidance setting out the principles of ICZM. Currently a new EU Directive is under discussion to establish a framework for maritime spatial planning and integrated coastal management.

The Coastal & Marine Union (EUCC) has been involved in many projects linked to aspects on ICZM including

information projects such as OURCOAST and capacity building projects (e.g. CoastLearn). EUCC has also been a hands-on organization establishing projects across Europe, primarily pre-accession projects in countries such as Poland and the Baltic States and in countries outside the EU including Russia, Ukraine, Morocco and Montenegro. Close working relationships have developed with similar organisations including Eurosite, Euronature and European Centre for Nature Conservation (ECNC).

Many of the strongest supporters of EUCC are also passionate about the European Dune Network, and we look to EUCC as our parent body. The dune network often holds side-events within larger EUCC conferences, and is also well represented at other conferences and workshops linked to LIFE + projects.

EUCC has a structure of national branches. Some of these are strong and active, forming national focal points for ICZM, whereas others are looser associations of professionals. There is no standard constitution for national branches so it can be difficult to put forward joint funding bids, for example. Many of these branches will come together for the 'family gathering' in Merlimont, France this year.

We hope that EUCC will continue to support the European Dune Network and that together we can look for funding opportunities which could be used to strengthen the network and help us communicate our ideas. Here's to the next 25 years!

For more information see [www.eucc.net](http://www.eucc.net)

## IUCN publishes Mediterranean dune restoration and management manual

Knowledge and good practice in the conservation and management of Mediterranean dunes is disseminated through this manual, published by IUCN. The guidance document (in French) covers aspects of the geomorphology, ecology and management of Mediterranean dunes, summaries restoration techniques and has a complete section on the cultivation of dune plants. The full citation is Ley de la Vega, C., Favennec, J., Gallego-Fernández J., et Pascual Vidal, C. (eds) (2012). Conservation des dunes côtières. Restauration et gestion durables en Méditerranée occidentale. IUCN, Gland, Suisse et Malaga, Espagne. 124 p. [www.iucn.org/publications](http://www.iucn.org/publications)

## Grains de Sable: the newsletter of the Office National des Forêts

Loïc Gouget of the French Forestry Service (ONF) has launched an e-newsletter highlighting projects and publications related to coastal dune management in France. The newsletter can be accessed at: [http://onf.evenementcom.net/onf\\_html/onf\\_dunes\\_06\\_2013.html](http://onf.evenementcom.net/onf_html/onf_dunes_06_2013.html) where you can subscribe with your e-mail details.

## Links to work in Poland

Tomasz Łabuz of the Institute of Marine Sciences at the University of Szczecin has an interesting web page on all aspects of the geomorphology of Polish dunes. Information can be found at <http://polishdunes.szcz.pl/>. There is also information available on a long-term research project 'Foredunes environment location, morphodynamics and vegetation – the biodiverse habitat of the Polish coast (FoMoBi)' at <http://en.fomobi.pl/>

## EUCC Conference and Workshop in France- 17-19 June 2014

To celebrate the 20th anniversary of EUCC France and the 25th anniversary of Coastal & Marine Union (EUCC) both associations are organising a field workshop and an international symposium dedicated to the Integrated Management of Coastal Dunes.

The events are not only aimed at dune scientists, experts and managers from all over Europe but also to policy makers, civil society representatives and nature protection associations to exchange know-how and experiences on coastal dunes.

More Information can be found on the dedicated webpages at <http://euccmerlimonten.wordpress.com/programme/international-symposium/>

The event will be held in Merlimont, Nord-Pas de Calais with the international symposium on 17th June, the field workshop on 18th June and discussions on 19th June. The organization is supported by the Office National des Forêts (ONF), the City-Council of Merlimont, the Conservatoire du Littoral, EDEN 62

## Littoral 2014: Facing Present and Future Coast Challenges - 22-26 September 2014

Littoral 2014 will be hosted by Klaipeda University, Lithuania, and celebrates the 20th anniversary of the EUCC Baltic States Office.

Littoral 2014, following the structure of previous coastal conferences, will address a wide range of coastal research, conservation and management issues and will provide opportunities for networking between coastal researchers and practitioners from all over Europe. Information on the programme, the sessions and side events is provided at <http://balticlagoons.net/littoral2014/>.

There will be a special session on coastal dunes convened by key network members Maike Isermann, Pat Doody and Paul Rooney. There are also two post-conference options to visit the Nemunas Delta, Curonian Lagoon and Curonian Spit.

## You want to carry out a research project on Spiekeroog?

We would like to use the opportunity to introduce to you to Wadden Sea Science Center which was established in 2011. Situated in the middle of the Spiekeroog Island surrounded by unique landscape of dunes, salt marshes and the Wadden sea. On offer are well equipped laboratories and course rooms for scientists and students of every age with associated accommodation.

Further details can be found in the attachment and on their homepage: [http://www.nationalparkhaus-wittbuelten.de/de/forschung/forschungszentrum\\_wittbuelten.html](http://www.nationalparkhaus-wittbuelten.de/de/forschung/forschungszentrum_wittbuelten.html)

If you have any queries, please do not hesitate to contact during working hours at: +49-4976-910060 or -69 or by mail: [forschung@wittbuelten.de](mailto:forschung@wittbuelten.de)

The European Dune Network newsletter has been compiled by John Houston, Tom Marshall and Paul Rooney Department of Geography and Environmental Science, Liverpool Hope University, Liverpool, L16 9JD.

The newsletter is produced in association with the Coastal and Marine Union-EUCC.

Please contact us on [dunes@hope.ac.uk](mailto:dunes@hope.ac.uk)

Websites: <http://coast.hope.ac.uk/> and

[http://www.eucc.net/en/european\\_dune\\_network/index.htm](http://www.eucc.net/en/european_dune_network/index.htm)

